CLAIMS

1. An electrically controlled fluidic valve separating two volume spaces, characterized in that it comprises:

   ➢ at least one microporous membrane (16), the surface of which is at least partly covered with at least one electroactive polymer essentially placed within the pores of said microporous membrane, so that, when said polymer is in a defined oxidation-reduction state, it blocks off said pores; and

   ➢ an electrical supply intended to allow said valve to switch from the closed state to the open state, and vice versa, by changing the oxidation-reduction state of the electroactive polymer.

2. The valve as claimed in claim 1, characterized in that the microporous membrane has approximately circular pores of approximately constant diameter.

3. The valve as claimed in either of claims 1 and 2, characterized in that the electrical supply has at least one electrode and at least one counterelectrode (28).

4. The valve as claimed in claim 3, characterized in that the electrode is formed by the microporous membrane (16).

5. The valve as claimed in one of claims 1 to 4, characterized in that the microporous membrane is made of a nonconductive material.

6. The valve as claimed in claim 5, characterized in that the nonconductive material is a polymer taken from the group comprising: polycarbonates (PC), polyamides (PA), polyethylene terephthalate (PET), polytetrafluoroethylene (PTFE) or Teflon®, and derivatives thereof.

7. The valve as claimed in claim 5, characterized in that the nonconductive material is a polymer taken from the group comprising: cellulose esters, cellulose nitrates and blends thereof.

8. The valve as claimed in one claims 5 to 7, characterized in that the membrane further includes at least one external metal layer.

9. The valve as claimed in the preceding claim, characterized in that the membrane further includes at least one intermediate polymeric layer to which the external metal layer is fastened.

10. The valve as claimed in one of claims 1 to 4, characterized in that the microporous membrane is made of a conductive material.

11. The valve as claimed in the preceding claim, characterized in that the conductive material is a metal taken from the group comprising: gold, platinum, palladium or any other equivalent material.

12. The valve as claimed in one of the preceding claims, characterized in that the electroactive polymer is a conjugated polymer taken from the group comprising: polyaniline, polypyrrole, polythiophene, polyparaphenylvinylene, poly(p-pyridylvinylene) and derivatives thereof.

13. The valve as claimed in one of claims 2 to 12, characterized in that the pore diameter lies in the range from 0.1 to 5 microns (μm), preferably from 0.2 to 1 μm.

14. The valve as claimed in one of the preceding claims, characterized in that the microporous membrane

has a thickness lying within the range from 10 μm to 1 mm, preferably from 10 to 30 μm.

15. A microfluidic device, characterized in that it includes at least one valve as claimed in one of claims 1 to 14.

16. A process for producing a valve as claimed in one of claims 1 to 14, characterized in that it comprises the following steps:

a) a microporous membrane is placed in an electrolytic solution containing at least one monomer;

b) an electrochemical current is induced in said electrolytic solution;

c) the monomer is fixed on to the microporous membrane, and especially in the pores of said membrane;

d) the radial polymerization of the monomer in the pores of said membrane is carried out; and

e) the polymerization is stopped by cutting off the electrochemical current when the polymers reach the center of the pores, so that said polymers block the pores without overlapping one another.

17. The process as claimed in the preceding claim, characterized in that it includes a prior step of metalizing the microporous membrane when said membrane is made of a nonconductive material, said metalization step comprising the following substeps:

a′) a microporous membrane is placed in a monomer solution;

b′) the monomer is fixed onto the microporous membrane;

c′) the polymerization of the monomer is carried out over the entire surface of the membrane so as to obtain a polymer layer;

d′) the membrane thus obtained is placed in a solution containing at least one metal salt; and

e′) the electrodeposition of the metal on the polymer layer is carried out by an oxidation-reduction

reaction so that the microporous membrane is covered with a metal film.

18. The process as claimed in the preceding claims, characterized in that the monomer is taken from the group comprising: pyrrole, thiophene and derivatives thereof.

19. The process as claimed in either of claims 17 and 18, characterized in that the metal salt is taken from the group comprising: gold cyanide, gold chloride or any equivalent compound.